

Abstract

A pressure sensor using an optically powered resonant integrated microstructure (O-RIMS). The pressure sensor comprises a planar substrate having a photodiode, a 5 polysilicon shell, a microbeam having a resonant frequency and fastened to the shell, and one or more optical fibers. A fluorescent material, such as erbium, is placed on the surface of the substrate in proximity to the microbeam. A Fabry-Perot cavity is formed comprising the substrate, the microbeam, and 10 the shell. Changes in the vibratory frequency of the microbeam caused by pressure on the shell causes light delivered by a optical fiber to be modulated as the microbeam vibrates. The modulated light is conveyed to a sensor 15 electronics arrangement via the optical fiber. The sensor electronics arrangement determines the pressure surrounding the O-RIMS from the modulated light.